Complete Summary

GUIDELINE TITLE

Care of the patient with diabetes mellitus. 3rd edition.

BIBLIOGRAPHIC SOURCE(S)

American Optometric Association. Care of the patient with diabetes mellitus. 3rd ed. St. Louis (MO): American Optometric Association; 2002 Aug 17. 60 p. [104 references]

COMPLETE SUMMARY CONTENT

SCOPE

DISEASE/CONDITION(S)

Ocular and Visual Complications of Diabetes Mellitus

Functional

- Tritan color vision deficiencies
- Refractive error changes
- Accommodative dysfunction
- Visual field defects

Extraocular Muscle Anomalies

Mononeuropathies involving third, fourth, or sixth cranial nerves

Pupillary Reflexes

Sluggish pupillary reflexes

Conjunctiva

Bulbar conjunctival microaneurysms

Tear Film

Tear film deficiencies resulting in dry eye syndrome

Cornea

- Reduced corneal sensitivity
- Reduced corneal wound-healing ability
- Basement membrane abnormalities resulting in increased frequency of abrasions or recurrent erosion syndrome
- Descemet's membrane wrinkling
- Endothelial cell morphology changes, often resulting in increased corneal thickness

Iris

- Depigmentation
- Rubeosis iridis, possibly with associated ectropion uvea and peripheral anterior synechiae
- Neovascular glaucoma

Lens

- Higher prevalence of cataracts
- Reversible opacities and snowflake cataracts (rarely seen in industrialized countries)

Vitreous

Hemorrhage in proliferative retinopathy

Retina

- Nonproliferative retinopathy
- Proliferative retinopathy
- Macular edema

Optic Nerve

- Papillopathy
- Ischemic optic neuropathy
- Open angle glaucoma

GUIDELINE CATEGORY

Diagnosis
Evaluation

Management
Prevention

CLINICAL SPECIALTY

Optometry

INTENDED USERS

Health Plans
Optometrists

GUIDELINE OBJECTIVE(S)

- To identify patients with undiagnosed diabetes mellitus (DM)
- To identify patients at risk of vision loss from DM
- To preserve human vision by reducing the risk of vision loss in patients with DM through timely diagnosis and intervention
- To improve the quality of care rendered to patients with DM
- To disseminate information and continue the education of health care practitioners regarding the ocular complications of DM and the availability of vision rehabilitation programs
- To stress availability of visual rehabilitation for those with vision loss from DM through low vision devices and psychosocial support

TARGET POPULATION

Patients of any age with diabetes mellitus

INTERVENTIONS AND PRACTICES CONSIDERED

Diagnosis of Ocular Manifestations of Diabetes Mellitus

1. Patient history
2. Ocular examination
    - Best corrected visual acuity
    - Pupillary reflexes
    - Ocular motility
    - Visual field screening
    - Refraction
    - Biomicroscopy
    - Tonometry
    - Stereoscopic fundus examination with pupillary dilation
3. Supplemental testing
    - Color vision assessment
    - Contrast sensitivity testing
    - Fundus photography or validated retinal imaging
    - Gonioscopy
    - Macular function assessment

Management of Nonretinal Ocular Complications

1. Patient education
2. Specific management strategies, based on type of ocular complication.

Management of Retinal Complications

1. Patient education
2. Referral for consultation and/or treatment
3. Scatter laser treatment
4. Focal laser treatment
5. Frequent follow-up evaluations (fundus photography, fluorescein angiography)

MAJOR OUTCOMES CONSIDERED

Effectiveness of management interventions to reduce ocular complications of diabetes

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Hand-searches of Published Literature (Primary Sources)
Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

The guideline developer performed literature searches using the National Library of Medicine's Medline database and the VisionNet database.

NUMBER OF SOURCE DOCUMENTS

Not stated

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Expert Consensus (Committee)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Not applicable

METHODS USED TO ANALYZE THE EVIDENCE

Review

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Not applicable

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Not stated

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Not applicable

COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

METHOD OF GUIDELINE VALIDATION

Internal Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

The Reference Guide for Clinicians was reviewed by the American Optometric Association (AOA) Clinical Guidelines Coordinating Committee and approved by the AOA Board of Trustees.

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

Diagnosis of Ocular Manifestations of Diabetes Mellitus

The first diagnosis of the patient who is unaware of having a diabetic condition may be based on an eye examination. Ocular examination of a patient suspected of having undiagnosed diabetes mellitus (DM) should include all aspects of a comprehensive eye examination. Particular attention should be paid to the ocular and systemic signs and symptoms of DM, as discussed in this section.

Patients with DM need regular eye examinations. The examination should include all aspects of a comprehensive eye examination, with supplementary testing as indicated to detect and thoroughly evaluate ocular complications. The frequency of examination is determined on the basis of several factors, including the type of DM, duration of the disease, age of the patient, level of patient compliance, concurrent medical status, and both nonretinal and retinal ocular findings. Due to the risk for progression diabetic retinopathy (DR) during pregnancy, a diabetic woman should have a baseline examination prior to a planned pregnancy or early in the first trimester of pregnancy.

Components of patient care, discussed in greater detail in the guideline document, include the following:

1. Patient history
2. Ocular examination

- Best corrected visual acuity
- Pupillary reflexes
- Ocular motility
- Visual field screening
- Refraction
- Biomicroscopy
- Tonometry
- Stereoscopic fundus examination with pupillary dilation

3. Examination technique
4. Supplemental testing
    - Color vision assessment
    - Contrast sensitivity testing
    - Fundus photography or validated retinal imaging
    - Gonioscopy
    - Macular function assessment

Management of Ocular Manifestations of Diabetes Mellitus

Treatment decisions depend upon the extent and severity of the patient's ocular condition.

a. Patients with Undiagnosed Diabetes Mellitus

Patients suspected of having diabetes mellitus (DM) should be screened for high blood glucose levels. The optometrist should refer the patient to a physician for evaluation or request a fasting blood glucose analysis. Patients with fasting blood glucose values of greater than or equal to 110 mg/dL but less than 126 mg/dL have impaired fasting glucose (IFG) and should be retested. All patients with fasting blood glucose values of 126 mg/dL or greater should be referred to physicians for further evaluation or treatment. Most pregnant women should be screened for glucose intolerance. Because a pregnant patient is usually under medical care, her obstetrician should coordinate this examination.

b. Patients with Nonretinal Ocular Complications

Management of nonretinal ocular complications of diabetes mellitus should be consistent with current recommendations of care for each condition. The management of nonretinal ocular complications of diabetes mellitus is briefly outlined in the following table. Treatment protocols should always include patient education and recommendations for follow-up visits.

Management of Nonretinal Ocular Complications of Diabetes Mellitus

Category	Ocular Complications	Management*
Functional	Tritan color vision loss	Dilated fundus examination to rule out diabetic maculopathy; counseling; low vision evaluation; review of independent living aids as necessary

Category	Ocular Complications	Management*
	Refractive error changes Accommodative dysfunction	Consultation with patient's physician regarding degree of blood glucose control; modification of spectacle prescription as necessary
	Visual field defects	Low vision evaluation; orientation and mobility training as necessary
Extraocular Muscle Anomalies	Mononeuropathies	Neuro-ophthalmology or neurology consultation; temporary prism spectacle prescription as needed; eye patching as indicated
Pupils	Sluggish pupillary reflexes Afferent pupillary defects	Workup to rule out optic neuropathy
Conjunctiva	Bulbar microaneurysms	Monitoring
Tear Film	Dry eye syndrome	Prescription of artificial tears, ocular lubricants, and other dry eye management techniques; monitoring for corneal complications
Cornea	Reduced corneal sensitivity	Monitoring for abrasions, keratitis, or other ulcerations
	Basement membrane anomalies, recurrent corneal erosions	Prescription of NaCl solution/ointment; artificial tears; patching as necessary
	Descemet's membrane wrinkling	Monitoring
	Endothelial cell changes	Monitoring Note: All corneal injuries should be monitored carefully for secondary infection or evidence of delayed wound healing. This is particularly important in patients who wear contact lenses.
Iris	Depigmentation	Monitoring; routine gonioscopy and tonometry
	Rubeosis iridis (neovascularization on the iris)	Gonioscopy to rule out anterior chamber angle involvement and neovascular glaucoma; dilated fundus examination to search for proliferative retinopathy; referral to retinal specialist for possible

Category	Ocular Complications	Management*
		laser surgery
Lens	Cataracts	Monitoring of both degree of lens opacification and status of any retinopathy; cataract extraction after careful preoperative retinal evaluation; surgery indicated if adequate visualization of the retina is no longer possible
Vitreous	Hemorrhage	Dilated fundus examination; consultation with retina specialist

*Patient education is an integral part of management for all conditions.

c. Patients with Retinal Complications

When indicated (generally for levels of moderate nonproliferative diabetic retinopathy [NPDR] or worse, any proliferative diabetic retinopathy [PDR], any macular edema, neovascularization of the iris, or unexplained vision loss), the optometrist should refer the DM patients to an ophthalmologist skilled in treating diseases of the retina or a retina specialist.

Available treatment options, management and follow-up for nonproliferative diabetic retinopathy, proliferative diabetic retinopathy and macular edema are discussed in greater detail in the guideline document.

Patient education is an important component of care because virtually all patients with diabetes mellitus will develop some form of diabetic retinopathy at some point during the course of the disease.

Diabetic patients who do not have diabetic retinopathy should be reexamined annually. The follow-up examination of patients with diabetic retinopathy should be scheduled in accordance with the clinical trial protocols. The frequency and composition of evaluation and management visits for retinal complications of diabetes mellitus are summarized in the following table:

Frequency and Composition of Evaluation and Management Visits for Retinal Complications of Diabetes Mellitus

Natural Course Rate to Progression to:	Composition of Follow-Up Evaluations	Management

Severity of Condition	PDR 1 year	HRC 5 years	Frequency of Follow-Up	Fundus Photography	Fluorescein Angiography	Referral for Consultation and/or Treatment	Scatt Lase Treatm
Mild NPDR	5%	15%					
No macular edema			12 mos	No	No	Communicate with patient's physician	No
Macular edema			4 to 6 mos	Yes	Occ.	Obtain retinal consult in 2 to 4 weeks	No
CSME			2 to 4 mos	Yes	Yes	Obtain retinal consult in 2 to 4 weeks	No
Moderate NPDR	12 to 27%	33%					
No macular edema			6 to 8 mos	Yes	No	Communicate with patient's physician	No
Macular edema (not CSME)			4 to 6 mos	Yes	Occ.	Obtain retinal consult in 2 to 4 weeks	No
CSME			2 to 4 mos	Yes	Yes	Obtain retinal consult in 2 to 4 weeks	No
Severe NPDR	52%	60 to 75%					
No macular edema			3 to 4 mos	Yes	No	Obtain retinal consult in 2 to 4 wks	Rarely
Macular edema (not CSME)			2 to 3 mos	Yes	Occ.	Obtain retinal consult in 2 to 4 wks	Occ. af focal*
CSME			2 to 3 mos	Yes	Yes	Obtain retinal consult in 2 to 4 wks	Occ. af focal*

	Natural Course Rate to Progression to:		Composition of Follow-Up Evaluations			Management	
Severity of Condition	PDR 1 year	HRC 5 years	Frequency of Follow-Up	Fundus Photography	Fluorescein Angiography	Referral for Consultation and/or Treatment	Scatt Lase Treatm
Non-high-risk PDR		75%					
No macular edema			2 to 3 mos	Yes	No	Obtain retinal consult in 2 to 4 wks	Occ.*
Macular edema			2 to 3 mos	Yes	Occ.	Obtain retinal consult in 2 to 4 wks	Occ. af focal*
CSME			2 to 3 mos	Yes	Yes	Obtain retinal consult in 2 to 4 wks	Occ. af focal*
High-risk PDR							
No macular edema			2 to 3 mos	Yes	No	Obtain retinal consult in 24 to 48 hrs	Yes
Macular edema			1 to 2 mos	Yes	Yes	Obtain retinal consult in 24 to 48 hrs	Yes
CSME			1 to 2 mos	Yes	Yes	Obtain retinal consult in 24 to 48 hrs	Yes

Abbreviations: CSME, clinically significant macular edema; HRC, high risk category; NPDR, nonproliferative diabetic retinopathy; PDR, proliferative diabetic retinopathy; Occ., occasionally

*Patient education and written communication with patient's primary care physician are integral to management of DM.
** Consider scatter laser treatment (PRP), especially if every severe NPDR (see levels of DR), significant medical complication, or type 2 DM
*** Consider scatter laser treatment (PRP), especially if moderate PDR (see levels of DR), significant medical complication, or type 2 DM

CLINICAL ALGORITHM(S)

The following clinical algorithms are provided in the original guideline document:

- Optometric Management of the Patient with Undiagnosed Diabetes Mellitus
- Optometric Management of the Patient with Diagnosed Diabetes Mellitus

EVIDENCE SUPPORTING THE RECOMMENDATIONS

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The type of supporting evidence is not specifically stated for each recommendation.

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

Until modalities are in place to prevent or cure diabetic retinopathy and other complications of diabetes mellitus, emphasis must be placed on identification, careful follow-up, and timely treatment, including laser photocoagulation, for patients with diabetic retinopathy and diabetic eye disease. Proper care will result in reduction of personal suffering for those involved and a substantial cost savings for the involved individuals, their families, and the country as a whole.

POTENTIAL HARMS

Not stated

QUALIFYING STATEMENTS

QUALIFYING STATEMENTS

- Clinicians should not rely on this Clinical Guideline alone for patient care and management. Please refer to the references and other sources listed in the original guideline for a more detailed analysis and discussion of research and patient care information.
- The components of care described in this guideline are not intended to be all-inclusive; professional judgment and individual patient symptoms and findings may have a significant impact on the nature, extent, and course of the services provided. The optometrist may delegate some components of care.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Living with Illness

IOM DOMAIN

Effectiveness
Patient-centeredness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

American Optometric Association. Care of the patient with diabetes mellitus. 3rd ed. St. Louis (MO): American Optometric Association; 2002 Aug 17. 60 p. [104 references]

ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

1993 (revised 2002 Aug 17)

GUIDELINE DEVELOPER(S)

American Optometric Association - Professional Association

SOURCE(S) OF FUNDING

Funding was provided by the Vision Service Plan (Rancho Cordova, California) and its subsidiary Altair Eyewear (Rancho Cordova, California)

GUIDELINE COMMITTEE

American Optometric Association Consensus Panel on Diabetes

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FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

GUIDELINE STATUS

This is the current release of the guideline.

This guideline updates a previously published version: Care of the patient with diabetes mellitus. 2nd ed. St. Louis (MO): American Optometric Association; 1998. 69 p.

GUIDELINE AVAILABILITY

Electronic copies: Available in Portable Document Format (PDF) from the American Optometric Association Web site.

Print copies: Available from the American Optometric Association, 243 N. Lindbergh Blvd., St. Louis, MO 63141-7881.

AVAILABILITY OF COMPANION DOCUMENTS

None available

PATIENT RESOURCES

None available

NGC STATUS

This summary was completed by ECRI on December 2, 1999. The information was verified by the guideline developer on January 27, 2000. This summary was updated by ECRI on April 16, 2004. The information was verified by the guideline developer on May 10, 2004.

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Date Modified: 11/15/2004